

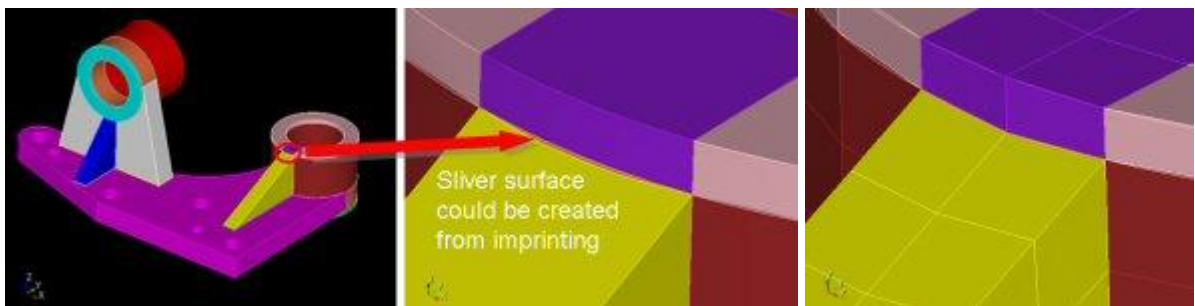
## **CUBIT 10.1 introduces major improvements in geometry preparation for simulation**

The CUBIT Team is pleased to announce Version 10.1 of the CUBIT Geometry and Mesh Generation Toolkit. Geometry preparation continues to be the major bottleneck in developing models for simulation at Sandia. Cubit 10.1 introduces several new operations in geometry improvement and simplification to address these needs.

Modeling of complex assemblies using CAD geometry is an important aspect of weapons design. The imprint operation is a geometric operator that facilitates the joining of components of an assembly so that a continuous domain can be represented. This vital operation, traditionally handled by commercial third party geometry libraries, is notoriously susceptible to geometric tolerance problems, and often results in sliver surfaces and extraneous details that can take hours or days to manually resolve. Cubit 10.1 introduces a new tolerant imprint operation that overcomes most of the issues common to third party geometry kernels, reducing what was once a tedious and cumbersome process of hours, to an automatic process of seconds.

CAD models developed using commercial modeling systems can also frequently contain extraneous features such as small edges or surfaces that are not needed for simulation. These features, typically discovered through tedious trial and error, can often have detrimental effects on the finite element mesh and the resulting simulation. CUBIT 10.1 introduces new capability for identifying and cleaning up poor geometry. Expanding its existing virtual geometry capability, new operations that allow collapsing edges and surfaces provide a powerful solution to this problem.

CUBIT continues to be the focus of state-of-the-art geometry and mesh generation research and development at Sandia National Laboratories. Sandia has long recognized the vital role geometry and meshing plays in computational engineering simulation. CUBIT represents a significant investment in improving tools needed to reduce the time to analysis. The geometry repair and simplification tools introduced in CUBIT 10.1 represent an example of how the CUBIT team is helping to facilitate science based engineering transformation at Sandia through improved modeling and simulation tools. (Steve Owen, 1421, 284-6599)



**Tolerant imprinting used to avoid creation of sliver surfaces.  
Resulting mesh shown after tolerant imprint.**